

FALL LAMB PRODUCTION BY A CALIFORNIA BIGHORN SHEEP

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Parturition is timed to maximize survival of offspring (Thompson and Turner 1982). Parturition occurring outside an optimum time period lowers reproductive fitness and, therefore, should be selected against. Timing of parturition in bighorn sheep (*Ovis canadensis*) has been related to resource abundance (Geist 1974, Bunnell 1982, Thompson and Turner 1982, Risenhoover and Bailey 1988) and climatic conditions (Stewart 1982). Parturition varies by latitude between subspecies (Thompson and Turner 1982) and by elevation within subspecies (Risenhoover and Bailey 1988). Peak lambing periods occur in March for desert bighorn sheep (*O. c. nelsoni*; Hanson 1960, Sandoval 1980, Witham 1983), May for California bighorn sheep (*O. c. californiana*; Jones 1950), and early June for Rocky Mountain bighorn sheep (*O. c. canadensis*; Bunnell 1982, Thompson and Turner 1982). Unusual lambing periods such as January for desert bighorn (Russo 1956, Welles and Welles 1961) and July for Rocky Mountain bighorn (Stewart 1982) were attributed to extremes in climatic conditions and elevations.

Vegetation in the Big Jacks Creek drainage, Owyhee County, ID, is dominated by sagebrush (*Artemisia* spp.), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Sandberg bluegrass (*Poa sandbergii*). Climatic conditions are characterized by warm, dry summers and cool winters. Total precipitation from November 1988 through March 1989 was equal to the 10-year average; however, most precipitation occurred as rain in November and March. Ten ewes, one ewe lamb, and three ram lambs from Chilcotin, BC, and two rams from East Fork Owyhee River, ID, were transplanted to

Big Jacks Creek during February and March 1988. Four ewes were fitted with radio-collars and periodically located to monitor their movements and status. Three radio-collared ewes were observed with lambs in May 1988. A fourth collared ewe (34) was observed with a lamb (A) less than two weeks old (based on size and behavior) on 26 October 1988. An average gestation period of 174 days for bighorn sheep (Shackleton et al. 1984) indicated conception occurred about 25 April 1988. Ewe 34 and lamb A were located monthly through March 1989. During 1987–1990, onset of parturition occurred from 11 April to 3 May, and mating activity was observed between October and December in an adjacent drainage. The birth of lamb A occurred approximately six months out of cycle. Ewe 34 was observed 4 January 1990 with a lamb (B) that appeared to have been born during the normal lambing period (April–June 1989). Lamb B was conceived between October and December 1988 while ewe 34 was nursing lamb A.

Ewe 34 may not have bred in 1987, or stress related to transplanting may have caused her to abort. Stress can affect any aspect of reproduction (DeForge 1976). Contact with rams during March and April 1988 may have caused ewe 34 to come into estrus. Presence of males has been found to induce estrus in female merino sheep (Watson and Radford 1960) and feral goats (Coblentz 1980). Recurrent estrus was observed in a cow elk (*Cervus elaphus*) that was associated with bulls but not bred during previous estrus periods (Morrison 1960).

Lamb survival has been related to forage quality (Wehausen et al. 1987, Festa-Bianchet

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1988a), precipitation patterns (as they affect plant growth; Douglas and Leslie 1986), population density (Douglas and Leslie 1986), and mother's age (Festa-Bianchet 1988a). Cheatgrass bromé (*Bromus tectorum*) seedlings were available in November, and Sandberg bluegrass greenup was observed in January. South-facing slopes were generally free of snow soon after storms. Cattle grazing occurred in riparian areas and on plateaus adjacent to drainages, areas that received limited use by bighorns during summer and lambing periods. Bighorn and mule deer (*Odocoileus hemionus*) populations were at low densities. Competition for forage was probably not a limiting factor. Festa-Bianchet (1988b) reported that lambs born to ewes four to nine years old had significantly higher survival rates than those born to two- to three-year-old ewes. Ewe 34 was estimated to be five years old in 1988. Mild climatic conditions, availability of green forage during weaning, limited competition for forage, and probable previous lambing experience allowed ewe 34 to raise an out-of-season lamb and survive concurrent fall/winter lactation and gestation periods. This observation suggests that under favorable conditions bighorn sheep may be able to successfully reproduce outside generally observed reproductive periods.

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